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Progress in the implementation of the Programme of Action for the Sustainable Development of Small Island Developing States

Report of the Secretary-General

Addendum

Science and technology for small island developing States*

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I. Current situation

1. Small island developing States are characterized by rich and diverse cultures of indigenous and traditional knowledge and technology. Many small island developing States lack a critical mass of qualified scientists and associated institutions. Current reward systems in island countries do not encourage long-term careers in science, and there is limited availability of funds for training and research in specialized fields of science. Brain drain adds to the scarcity of skills and expertise in relation to the advance of science in small island developing States. This is evident in the high proportion of expatriate personnel in island institutions and in aid programmes heavily weighted towards technical assistance.

2. At primary and secondary levels, the educational performance of small island developing States, except for those that are in the least developed category, has been better compared with that of many other developing countries. A number of small island developing States have made efforts to introduce basic science in school curricula, but progress in science education has been slower than desired. In the area of higher education, small island developing States could benefit tremendously from pooling their resources at the regional level.

3. Any strategy for endogenous scientific and technological capacity-building in small island developing States must take into account the fact that these countries are constrained by small manpower and inadequate infrastructure that is dependent on very few industries.

4. Most small island developing States would derive tremendous benefits from the introduction of environmentally sustainable technological innovations in the areas of the development of renewable energy, freshwater and marine resources; telecommunications and information technology; waste management and natural disaster mitigation; and sustainable land resources management. Effective utilization of technological innovations is predicated on the building of technical skills commensurate with needs, which in turn depends on the level of scientific education.

5. Most small island developing States do not possess economies of sufficient scale to allow for a national scientific infrastructure of the scope required to address many national needs. One solution to this problem is for countries to cooperate at subregional or regional levels to share institutions of higher learning and advanced research and development facilities. Pooling the resources of countries with similar problems, agreeing on common programmes and building synergies are evidently more cost-effective than developing national institutions. Given the serious lack of resources and qualified personnel in small island developing States, a realistic short-to-medium term strategy for building scientific and technological capacity to manage the effective transition to sustainable development would be to concentrate on subregional measures, wherever feasible. Subregions usually tend to share several common characteristics which facilitate a more rational and efficient use of resources, including qualified staff. Subregional efforts also have greater potential for creating local capacity in the short to medium term than regional (continental) and international programmes. Frequent contacts between scientists from small island developing States and industrialized and relatively advanced developing countries would serve as an efficient modality for rapidly disseminating and applying new scientific and technological methods. At relatively low cost, much could be achieved in practical terms by establishing funds for scientific visits and meetings, electronic communication, access to data banks and so on.

II. International efforts to assist small island developing States in the field of science and technology

6. A number of United Nations organizations and agencies support programmes and activities in small island developing States which focus on strengthening science and technology in particular sectors. Some highlights of their activities are provided below.

7. The regional Science Education in Pacific Schools programme of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) has set basic scientific literacy as its major goals. The Australian National Commission for UNESCO is currently planning a Pacific consultation meeting on science and technology in 1998-1999. Possible objectives of the meeting include sharing of experience among countries that have well-defined science policy mechanisms; education in countries that lack science policy mechanisms; education on technology choice; and the formulation of required actions to enhance science and technology in island countries. During 1998-1999, UNESCO plans to implement, through its Apia Office in Samoa, a special project entitled "Youth leadership-for a culture of peace in the Pacific". This high-profile activity will bring together young people regionally and nationally to express their concerns on the major issues affecting their future peace and well-being, including science, technology and

environmental issues. The scientific environmental programmes of UNESCO and its Intergovernmental Oceanographic Commission (IOC) contribute to the advancement of knowledge, capacity-building and the promotion of the application of best practices in relation to marine and terrestrial resources in small island developing States. The International Hydrological Programme, the International Geological Correlation Programme, the Man and Biosphere Programme and the programmes of IOC cooperate in the interdisciplinary Project "Environment and development in coastal regions and small islands". They have jointly initiated several pilot projects in the Pacific and the Caribbean. Under UNESCO's Pacific World Network of Microbiological Resources Centre, activities help to raise knowledge and awareness of how to apply microbial biotechnology, and provide support to the application of tissue culture. The World Solar Programme 1996-2005, which is promoted by UNESCO, aims at improving renewable energy activities in some small island developing States.

8. The United Nations Industrial Development Organization (UNIDO) provides assistance in the development of local capabilities to identify, assess technologies and to effectively negotiate technology transfer operations. UNIDO assistance aims to promote the generation, diffusion and management of industrial technology. It also undertakes training activities to strengthen national capabilities for feasibility studies of industrial projects. UNIDO is currently developing software packages based on expert system technology to serve that purpose. The objective of a special programme of the International Centre for High Technology and Science established under UNIDO is to strengthen national training capabilities and expertise in small island developing States in the acquisition and utilization of advanced methodologies and techniques in the area of integrated coastal zone management. UNIDO is in the process of developing guidelines for the development, negotiation and contracting of build-operate-transfer projects which aim to facilitate the financing of public infrastructure projects involving technology transfer operations, and the development of the energy sector in small island developing States is expected to benefit from that scheme. To increase awareness of the opportunities for industrial development, UNIDO publishes the *Emerging Technology Series*, which provides information on technological changes, including in marine-based industry, for the benefit of developing countries in particular. To promote regional and interregional cooperation for the development of technological capacity, it is currently undertaking consultations on the economic, technical and financial feasibility of establishing regional technology centres and their networks in the Caribbean and the Mediterranean.

9. UNDP has taken a number of initiatives in support of science and technology for small island developing States. Examples include: (a) a regional programme to support the Pacific islands power sector in developing the capacities of power utilities by promoting their management and technical skills; (b) workshops in rural areas on the operation and maintenance of small electricity generating systems within the framework of the UNDP programme on diesel operators/mechanics training for Pacific island countries; (c) technical assistance in the form of expert consultancies and training courses in connection with the UNDP training development programme in the Pacific; (d) a programme for small island developing States in the Pacific region on island countries development and training, which has assisted entrepreneurs in Pacific small island developing States to establish linkages for the acquisition of technical guidance and assistance in managing new manufacturing and processing enterprises; (e) assistance to several small island developing States in the Pacific region in establishing boatyard and mechanical workshop facilities for improving national capacities in industrial fisheries. As regards traditional knowledge, a number of projects within the World Decade of Cultural Development focus on the link between culture and resource use. Several Food and Agriculture Organization of the United Nations activities focus on local knowledge and natural resources, including programmes on community forestry and non-wood timber products. Traditional medicine is promoted through the programmes of the World Health Organization.

10. Through its marine environment laboratory in Monaco, the International Atomic Energy Agency (IAEA) is involved in pilot monitoring programmes on micropollutants, as well as in capacity-building and quality assurance activities in island States of the Caribbean and East African region. IAEA supports projects involving isotope and nuclear techniques for studying retrospective conditions (climate, sea level, pollution) and to provide time-scales for small island evolution. In the framework of its five-year research project on worldwide marine radioactivity, IAEA has conducted the Pacific Ocean Expedition, which provides inputs for oceanographic, marine resources and natural disasters. In collaboration with IOC, IAEA has been active in the International Mussel Watch project. The International Council of Scientific Unions Committee on Science and Technology in Developing Countries proposes to identify ways in which science and science communication can be

strengthened in small States on the basis of their own knowledge, natural resources and needs.

11. In the past few years, the World Meterological Organization (WMO) has organized eight workshops in the small island developing States regions on training participants from the national meteorological facilities of small island developing States to upgrade their national technical capabilities. In the period under review, WMO has awarded fellowships for studies and/or training in meteorology and operational hydrology to more than 20 small island developing States. The Nedi Tropical Cyclone Warning Centre in Fiji has been designated as a WMO regional specialized meteorological centre since June 1995 in order to provide advisory services on tropical cyclone detection, monitoring and forecasting to the national meteorological services of the South Pacific.

12. A satellite-based system in the Caribbean and Central America, in operation since April 1996, has replaced existing terrestrial communication links with a view to providing rapid exchange of meteorological information, including data for improvements in natural disaster warnings. Obsolete weather radars in the English-speaking Caribbean have been replaced by modern radars in order to improve early warning services for hurricanes. Through its public weather services programme, WMO provides assistance to its members, especially those vulnerable to natural disasters, such as the small island developing States, to fulfil its primary role of providing forecasts and warnings in support of safety of life and property. A recent project under this programme was to prepare a guide to public weather services and practices to assist members in the implementation of their national programmes.

III. Recommendations for future action in the field of science and technology

A. Science

1. National level

13. Intensive and appropriate use of science and technology in small island developing States is essential for attaining sustainable development goals. Governments of small island developing States are encouraged to:

(a) Make greater efforts to improve science education in all phases of formal and informal education;

(b) Establish a network of scientists to work in schools and in the public and private sectors;

(c) Undertake national or regional assessments of needs for capacity-building in science;

(d) Promote strong linkages between universities and research institutions on the one hand, and national industries, agriculture and other economic sectors on the other hand, so that scientific knowledge and information finds its way into the productive sectors, and make every effort to induce the private sector of national economies to invest more in the development of science;

(e) Take steps to record and apply indigenous knowledge in promoting participatory approaches to natural resources management and to the equitable and sustainable use of resources.

2. Regional and international levels

14. Relevant regional organizations and international organizations, with donor assistance, could collaborate in assisting small island developing States to:

(a) Implement programmes to improve the teaching of basic science within the context of the local environment and culture. In Pacific small island developing States, use could be made of the regional Science Education for Pacific Schools programme;

(b) Better educate present and future leaders of civil society on key scientific issues affecting a sustainable future, through schools, youth work and community awareness activities.

B. Technology

1. National level

15. The Governments of small island developing countries are encouraged to:

(a) Provide incentives to venture capital and explore other modalities for meeting the required financing needs of environmentally sound technology firms;

(b) Provide fiscal and other policy incentives to encourage domestic and foreign investment in the industrial sector, and consider special incentives for environmentally sound technology-related investments.

2. Regional level

16. At the regional level it is necessary to:

(a) Promote the establishment of appropriate regional institutions for the collection and synthesis of data and information on innovative industrial technologies for the

sustainable development of small island developing States, and on the impacts of industrial innovation on their economies, including their marine and coastal systems;

(b) Develop regional mechanisms to further promote ventures for financing new technology-based firms;

(c) Assist small island developing States with very small populations in:

(i) Better applying science and technology to sustainable development at the community level through participatory projects;

(ii) Sharing information on best practices and successful methods.

3. International level

17. The international community is urged to:

(a) Enhance international cooperation in the development and promotion of technological innovations relevant for small island developing States as components of international or regional investment projects;

(b) Provide improved access to financial and technical resources to assist small island developing States in establishing regional centres for capacity-building, including training in the management of innovative technologies, technology negotiations and technology transfer.